

The North American Plan for Avian and Pandemic Influenza: A Case Study of Regional Health Security in the 21st Century

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In August 2007, the governments of Canada, Mexico and the United States established the North American Plan for Avian & Pandemic Influenza (NAPAPI), as part of an evolving trilateral system of regional cooperation. Under its mandate, this transnational organization had the responsibility for coordinating the influenza prevention plans of the three countries, providing assistance where necessary, and preventing the disruption of cross-border trade. During the A/H1N1 influenza pandemic of 2009, the NAPAPI fulfilled its promise by helping the three national governments deal with this public health crisis, as well as maintaining the principles of the North American Free Trade Agreement (NAFTA). This study examines the historical development of regional health security since the 1950's, with special emphasis on the role that Canada assumed in the development of important collaborative arrangements that established the ground-work for the North American Plan for Avian & Pandemic Influenza.

INTRODUCTION

In March 2009, a mysterious infectious disease spread throughout certain regions of Mexico, causing widespread illness and death.¹ After consultation with experts at the Winnipeg National Microbiological Laboratory and the U.S. Centers for Disease Control, Mexican health authorities informed the World Health Organization (WHO) that the causative agent of this disease outbreak was influenza A/H1N1, the same virus sub-type linked with the 1918-19 devastating Spanish Influenza Pandemic.² On June 11, 2009, the World Health Organization announced that the A/H1N1 influenza outbreak was a pandemic, and that all member nations should adopt the appropriate public health measures. For health officials in Canada, Mexico and the United States, this meant not only reliance on their respective national influenza pandemic response systems, but also the commitment of working through the North American Plan for Avian and Pandemic Influenza (2007), and its specialized committees.³

This paper will consider the North American Plan for Avian & Pandemic Influenza (NAPAPI) within the framework of global and regional health security, past and present.⁴ First, there will be a brief assessment of how the three countries have cooperated in dealing with major outbreaks of infectious diseases since the Second World War. Here, special attention will be placed on Canada's willingness to provide medical and health assistance to Mexico and other Latin American countries both prior to joining the Organization of American States (OAS) in 1989, and during the past 21 years. Second, the influenza pandemic of

1957, one of the major international health crises of the twentieth century, will be examined both in terms of its impact on Canada and the United States, and the extent that it provided a catalyst for cross-border public health assistance. In this section reference will also be made to the connection between Canadian and American biodefense programs, both during the Cold War, and more recently with the October 2001 establishment of the Global Health Security Initiative (2001). Third, the 21st century crises involving avian and pandemic influenza will be addressed, with special emphasis on how the national programs of Canada, Mexico and the United States have been influenced by initiatives emanating from the WHO and the United Nations System of Influenza Coordination. In addition, the drafting and development of the North American Plan for Avian and Pandemic Influenza will be analyzed between August 2007 and the outbreak of the H1N1 (swine flu) in March 2009. Finally, an attempt will be made to determine whether the NAPAPI has made a difference in how health professionals in Canada, the United States and Mexico have dealt with the recent swine flu pandemic.⁵

OVERVIEW

The connection between global health security at the national, regional and global level has become a subject of increased importance for medical scientists, public health specialists, academic scholars and government administrators. In particular, the challenge of coping with emerging and recognized infectious diseases is providing a catalyst in bringing these different fields together, fostering impressive interdisciplinary research and publications.⁶ Another dimension of this convergence of different health security themes has been recent attempts to view biosecurity in a more holistic way, which “encompasses threats from both biological weapons and naturally occurring infectious diseases...integrating two policy realities previously separate from one another—security and public health.” An essential dimension of this approach is “that effective biosecurity policy has to involve globalized forms of governance...[since] security and public health can no longer view the world through the state-centric lenses of national governments and intergovernmental coordination.”⁷

This trend of viewing health security as an essential part of national foreign policy formulation, as well as influencing the broader contours of international relations, has important implications. First, from the perspective of the World Health Organization this convergence represents a window of opportunity which could “promote the use of a health lens in formulating foreign policy...[providing] opportunities for both diplomats and public health specialists in the interface between health and foreign policy.”⁸ A second approach, advanced by David Fidler and others, has been to develop a more complex set of variables to explain why public health has emerged “as an integrated public good relevant to many governance agendas...[which] has escaped, for good reasons, the ‘House that WHO Built’...[and] can no longer be captured politically or analytically through a single governance structure.”⁹ A third dimension of this evolving global system of health governance is the role of regional health organizations and health related inter-governmental agreements.¹⁰ According to

the 2008 report *One World One Health: A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface*, neighboring countries should adopt new strategies to establish “coordinated surveillance and emergency planning that can effectively establish a shared strategy and the joint use of diagnostic and rapid response resources and facilities...[and]the monitoring and management of cross-border movement of humans, animals and animal products.”¹¹ In part, this meant building on previous programs such as the Global Fund to Fight AIDS, Tuberculosis, Malaria, and, in part, the adoption of another set of strategies that would “generate new knowledge, work with countries to improve their approaches and share lessons at the regional and global levels.”¹²

During the past fourteen years one of the greatest threats to global health security has been a series of outbreaks of avian and human influenza. In 1996, the highly pathogenic (HPAI) form of the H5N1 influenza A virus was first detected in geese in Guangdong Province, China, spreading to poultry in Hong Kong the following year.¹³ What made the latter incident so alarming was evidence of human infection, with six out of eighteen cases proving fatal. By March 11, 2009, there were reports of 411 confirmed human cases in 17 countries, with the total death toll reaching 254 (62.4 percent).¹⁴ At this stage, almost all of these fatalities were associated with sustained high exposure to infected birds, with little evidence of human to human transmission.¹⁵ There was, however, no guarantee that this situation would continue, given the tendency of the influenza A virus to periodically create novel strains. As a September 2006 report of Health Canada explained, “there are concerns that this virus could mutate—or if someone infected with human influenza also became infected with H5N1 avian influenza, the viruses could ‘mix’ creating a new strain...causing an influenza pandemic.”¹⁶

The subject of emergency health security coordination between Canada, the United States, and Mexico has received little attention from scholars, either in the historical or contemporary context. There are various reasons for this deficiency. First, while the bilateral pattern of health security cooperation has been established, within the framework of United States-Canada and United States-Mexico relationships, the trilateral dimensions really only became important after Canada joined the Organization of American States in 1989. Second, during the past twenty years the level of Canada’s involvement with Mexico has been greatly expanded by the 1994 North American Free Trade Agreement (NAFTA), and the 2005 creation of the Security and Prosperity Partnership (SPP), based on the principle that the three countries should “work together to find approaches that address common issues...while ensuring that each nation—and the continent as a whole—remains secure against external threats and criminal activity.”¹⁷ These principles were first drafted at the 2005 Waco Summit, then refined and expanded at the 2006 Cancun Summit, and given specific form at the 2007 Leader’s meetings at Montebello, Quebec.

On August 23, 2007, Prime Minister Stephen Harper of Canada, President Jose Caledron of Mexico, and President George W. Bush of the United States issued a series of carefully orchestrated formalized statements. One of the most essential of these was the announcement that an important document, *The North American Plan for Avian & Pandemic Influenza* (NAPAPI) had been prepared

under the direction of the Security and Prosperity Partnership. Among its many features, NAPAPI pledged that a major health crisis would not seriously disrupt the sensitive North American trading system since the three countries would coordinate their efforts “to contain a novel strain of human influenza at its source, slow its spread...[but] allow the appropriate movement of people and cargo across mutual land borders and ports of entry in a way to achieve the public health objective with minimal social and economic impact.” Although there was a commitment to mutually agreed principles and procedures, there was also an acknowledgement that “each country should gauge the severity of the influenza pandemic and implement public health measures and/or community based interventions accordingly.” The actual administration of the plan was delegated to the North American Coordinating Body for Avian and Pandemic Influenza, (NACOBPI) composed of “senior officials from most of the key agencies that would...play a significant role in promoting coordination among the three countries at senior levels.”¹⁸

NORTH AMERICAN HEALTH SECURITY IN A HISTORICAL PERSPECTIVE

The possibility that Canada would develop institutionalized public health relations with Mexico and Latin America only became a reality in October 1989 when Prime Minister Brian Mulroney announced Canada’s intention to seek full membership in the Organization of American States. Prior to this time, the prevailing viewpoint among federal politicians and civil servants was that the OAS offered few benefits to Canada, its programs would be a drain on the Canadian treasury, and, above all, Canada’s membership in this body would invariably complicate its relationship with the United States.¹⁹

On the health front, however, there had been periodic examples when the Canadian government and private medical agencies had provided assistance to the Pan American Health Organization (PAMA), although it did not actually join this organization until 1971.²⁰ For example, between 1946 and 1951, Canada aided the United States in helping Mexico contain a serious foot-and-mouth disease epidemic, in part because of a request from Washington for veterinarian and quarantine specialists, and in part because of “the widespread disease dissemination of the infective agent and the rapidity of its spread...[and] the possibility of introduction into Canada.”²¹ Canada was also involved with attempts by the World Health Organization to eradicate malaria (1955-70) and smallpox (1966-80) from the western hemisphere, although only the latter program received regular funding from Canadian authorities.²² The apparent dichotomy between these two situations can be explained in two ways.²³ First, Canadian assistance for the smallpox program was channeled through the world famous Connaught Medical Laboratories of the University of Toronto, a private rather than government agency; and second, because Ottawa was not directly involved, there were no institutional public health obligations, or regional political entanglements.²⁴

While the threat of malaria, and even smallpox, was quite remote for most Canadians by the late 1950’s, this was not the case with influenza, which every year claimed thousands of Canadian lives. This situation became even more

challenging during the 1957-58 flu season, when a novel influenza virus (A/H2N2) emerged, that would eventually kill two million people globally, including about 69,000 in the United States and 7,000 in Canada.²⁵ International recognition of the pandemic virus occurred in May 1957, when the WHO Committee on Influenza provided an analysis of H2N2, noting it had different surface antigens than previous influenza sub-types, which meant that existing vaccines would “not give protection against the new Far East strain.”²⁶ As a result, the Committee warned that there was “the possibility of a repetition of the 1918 situation...[and] that the first sign of such a change would probably be the occurrence of deaths due to proven virus infection in unusual age groups, particularly young adults.”²⁷

There are a number of reasons why the so-called “Asian Flu” provides an interesting case study of national health security policies, and the challenge of regional public health cooperation. First, although the World Health Organization provided overall guidance and logistical support in tracking and analyzing the A/H2N2 influenza virus, the real task of coping with this health crisis took place at the national level, where public health capabilities and social values varied considerably among WHO members. This was certainly the case in North America, where the United States, Canada and Mexico each developed their own set of strategies, with only occasional consultation taking place between Washington, Ottawa and Mexico City. Second, by 1957 medical researchers in North America were aware of the basic features characteristics of the influenza virus: namely, that it was divided into A, B, and C types, with the former (A) being the most dangerous and unstable. Further, researchers knew that sub-types of A/influenza regularly appeared due to the activity of two important surface glycoprotein receptors: the 16 haemagglutinin (HA 1-16) and the nine neuraminidase (NA 1-9).²⁸

Even more important was the awareness that, unlike the outbreaks of 1937, 1943-44 and 1951, which were caused by antigenic drift (changes due to mutation in the HA gene), the appearance of the H2N2 virus represented a genetic shift, “an avian/human reassortants in which 2-3 avian gene segments were reassorted with the then-circulating human-adapted virus.”²⁹ Moreover, like its infamous 1918 predecessor, the Asian Flu pandemic went through three distinct stages: a spring-summer smattering of cases, a major surge of infections during the fall months of 1957, followed by a deadly wave in January-April 1958, that accounted for almost 40 percent of the total fatalities.³⁰

Although Canada and the United States each developed their own national strategies in dealing with the pandemic, there were a number of similarities in terms of their public health priorities. Both emphasized the importance of obtaining sufficient quantities of H2N2 vaccine in a timely fashion, assisting hospitals in dealing with the surge of infected patients, coordinating laboratory and clinical resources facilities across the country and carefully monitoring the progress of the pandemic through regular consultation with the WHO. In Canada, most of this work was carried out by the special Canadian Advisory Committee on Influenza, which worked closely with the federal Department of National Health and Welfare (DNHW), along with the ten provincial ministries of health, and, on occasion, with the US Advisory Committee on Influenza.³¹ This

latter connection was particularly important in determining Canada's vaccine policy, which focused on the production of a monovalent vaccine by the country's two leading laboratories—Connaught Medical Research Laboratories of Toronto, and the Montreal-based Institute of Microbiology and Hygiene.³² There was, however, considerable debate whether the influenza vaccine should be imported from the United States if shortages should occur, with the Quebec provincial government successfully arguing that free market conditions should prevail.³³ On the other hand, defenders of a Canada-first vaccine strategy pointed out that during the fall of 1957 there were a number of stories in the US media claiming that the American H2N2 influenza vaccine had caused many serious health complications, even death. Fortunately, this fear-mongering was contained.³⁴

However, there were also legitimate criticisms about the US and Canadian influenza prevention systems. The most serious was that the deliveries of the vaccine from the drug companies were too little, too late. By mid-October, when the second H2N2 wave crested, existing supplies were only sufficient to inoculate less than 20 percent of the American and Canadian population.³⁵ In both countries, there were problems of communication between officials of the national departments of health, and their provincial/state counterparts. This situation was aggravated by the fact that certain urban centers were particularly hard hit by the pandemic, with New York City, for example, having more cases per capita than any other American city.³⁶ Fortunately for public health officials in Ottawa and Washington, the H2N2 pandemic was less severe than they had predicted, and that the death toll from opportunistic bacteria was limited by the extensive use of antibiotics.³⁷

Another legacy of the 1957-58 crisis was that the on-going cooperation between the Department of Health and Welfare and the U.S. Public Health Service in exchanging epidemiological information about influenza patterns, and in the development of vaccines, reinforced existing scientific and governmental connections.³⁸ These linkages would be reactivated in 1968-69 when influenza A/H3N2 (Hong Kong Flu) emerged as the dominant novel virus, causing a pandemic that claimed approximately one million lives globally.³⁹ Even closer relations occurred in 1976, amidst fears that the world was facing a potentially new and deadly strain of H1N1 (swine flu). Canada did not, however, follow the lead of the Ford administration, which authorized 150 million dollars for the immunization of the entire US population, a policy that seriously backfired when the much feared pandemic did not materialize.⁴⁰

North American Biodefense: Canadian and American Military Cooperation

Between 1939 and 2010, Canada and the United States have been involved in medical and scientific collaboration, through their long term partnership in protecting North America from a biological warfare attack. This symbiotic relationship between biodefense, and containing disease outbreaks dates back to the Second World War, when Canadian and American war leaders feared that the Axis powers would resort to biological warfare, using a variety of deadly human and animal pathogens.⁴¹ Although biowarfare did not occur, there were a number of threatening incidents that convinced both governments of the advantage of

retaining their wartime defensive arrangements after 1945. The advent of the Cold War saw the United States, with the support of Canada and the United Kingdom, create a number of defensive measures, including the development of vaccines and medical countermeasures; Washington also maintained a retaliatory capability, at least until 1969, in order to deter Soviet BW weaponeers.⁴²

There are a number of ways that the operation of the Canada-U.S. military biodefense system has facilitated North American health security cooperation.⁴³ First, after the terrorist attacks of September 11, and the anthrax letter bomb incidents, defense scientists in both the United States and Canada were mobilized into broadly based biodefense programs, working closely with public health officials.⁴⁴ Second, by 2007 the United States had also developed an extensive civilian biodefense system consisting of three major programs:⁴⁵ BioShield: a series of medical countermeasures, including development of new vaccines;⁴⁶ BioWatch, an ambitious attempt to improve BW surveillance and early warning sensors; and the operation of the National Biodefense Analysis and Countermeasures Center at Fort Detrick (2005).⁴⁷ In addition, there was the establishment of the Biomedical Advanced Research and Development Authority (BARDA), with an emphasis on an all-hazards approach, which equates bioterrorist attacks with major natural disasters, such as Hurricane Katrina, or an outbreak of pandemic influenza.⁴⁸

At the same time, there have been a number of important bilateral biosecurity arrangements between the United States and its North American neighbors, such as the formation of the US-Mexico Border Health Commission, with its mandate “to develop coordinated and bi-national actions that will improve the health and quality of life on the border.”⁴⁹ Equally important has been Canada’s involvement with the TOPOFF (Top Officials) series of US emergency training exercise, featuring weapons of mass destruction. In 2003 for example, TOPOFF 2 developed an elaborate cross-border scenario, which involved a simulated bioterrorist attack on Chicago’s international airport, with many of the victims being unsuspecting Canadian travelers en route to Toronto and Montreal.⁵⁰

Bioterrorism and the Global Health Security Initiative

After the terrorist attacks of September 2001, Ottawa developed a number of strategies for protecting Canadians from terrorist threats, and reassuring Washington about its biodefense capabilities. Of particular importance were the extensive negotiations between Canada and the United States that culminated in the 32-point Smart Border Agreement of December 2001.⁵¹ Another part of this North American counter-terrorism effort was the establishment of the Global Health Security Initiative (GHSI) with a mandate “to strengthen the public health response to the threat of international biological, chemical and radio-nuclear terrorism.” Although it began in November 2001 as a US-Canada health security program, it was soon expanded to include the health ministers of the G-7, along with Mexico.⁵²

Since its formation, the GHSI has held eight ministerial meetings in the capitals of the eight member states, including Ottawa (2001), Mexico City (2002),

and Washington DC (2007), along with a large number of consultative sessions between health and security experts. Many of these cooperative programs were directed by the Global Health Security Laboratory Network (GHSAG), coordinated by Canada, with its emphasis “on enhancing health security, improving collaboration among high level laboratories, expanding linkages in order to strengthen the ability to rapidly and accurately diagnose diseases whether naturally or intentionally occurring, and strengthening overall global public health capacity.”⁵³ Significantly, by 2004 the Global Health Security Initiative was devoting more attention to the threat of emerging infectious diseases such as Severe Acute Respiratory Syndrome (SARS), which had crippled Toronto’s health care system during the spring of 2003, and the even greater menace of H5N1 avian and human influenza.⁵⁴ Efforts were also made to work more closely with the WHO, particularly after 2005, when the World Assembly had branded pandemic influenza as the greatest threat to global health.⁵⁵ These warnings were accompanied by changes in the structure and technology of international health security, particularly with the 2005 enactment of the International Health Regulations, which stipulated that all countries must report disease outbreaks, as well as the establishment of the WHO Global Influenza Surveillance Network.⁵⁶

The work of the Global Health Security Initiative has also facilitated the emergency preparedness and public health functions of the North American Security and Prosperity Partnership.⁵⁷ For example, key administrators at the Public Health Agency of Canada were involved with both the GHSI and SPP, and had developed close working relationships with their American and Mexican counterparts. In addition, these trilateral public health linkages were reinforced by the work of the GHSAG laboratory network, particularly the close connections between the Winnipeg Microbiological Laboratory and the major American high containment facilities. But in many ways the most substantial contribution of the GHSI was the fact that Mexico assumed an active role within the organization, despite its smaller medical research and public health capabilities.⁵⁸

THE NORTH AMERICAN PLAN FOR AVIAN & PANDEMIC INFLUENZA

At the March 2006 Cancun Summit, the leaders of the United States, Canada and Mexico designated three priority security policies for further review: reinforcing smart and secure borders; enhancing emergency management; and dealing with avian and human pandemic influenza. In developing this trilateral disaster management system, there were two guiding principles. First, that critical equipment, supplies and personnel could be deployed expeditiously throughout North America.” And second, that the public health dimensions of the plan would be based on “a comprehensive, science-based and coordinated approach within North America...[based on] shared principles to underpin cooperative activities by our Governments in all stages of ...pandemic influenza management: prevention; preparedness; response and recovery.”⁵⁹ Yet, it was one thing to issue general guidelines, and quite another to draft a comprehensive document that would cover the necessary medical, public health and national security issues.

Not surprisingly, this project was strongly influenced by various international developments such as previous initiatives adopted by the World Health Organization, the World Organization for Animal Health (OIE), and the International Partnership on Avian and Pandemic Influenza, launched at the United Nations General Assembly in September 2005. In the latter case, the guidelines included highlighting the threat of avian influenza on national agendas, coordination of efforts between countries, more effective surveillance systems, increased transparency in disease reporting and improved national and local public health capabilities to deal with a pandemic.⁶⁰ Equally important were the national pandemic influenza plans adopted by Canada, Mexico and the United States, since the North American pandemic plan was expected “to be subordinate and complementary to domestic response plans, existing arrangements and bilateral or multilateral arrangements.” For Canada, there was the comprehensive Canadian Public Health Agency’s 2004/06 Report on Pandemic Influenza which outlined the nature of the problem, stages of response, and the national and international ramifications of an influenza outbreak.⁶¹ For Mexico, there was the August 2006 Plan nacional de preparacion y respuesta ante una Pandemia de Influenza.⁶² Finally, for the United States, there was President Bush’s National Strategy, issued on November 1, 2005, which called for a comprehensive and sustained effort to deal with the imminent crisis, along with the warning that “if we wait for a pandemic to appear, it will be too late to prepare.”⁶³

The task of organizing the Canadian team for the NAPAPI project was the responsibility of the Department of Public Safety,⁶⁴ with the Public Health Agency/Health Canada, the Department of Agriculture and the Canadian Food Agency providing most of the technical expertise.⁶⁵ The Department of Foreign Affairs assumed an important liaison role both between the various Ottawa departments and agencies, and with the U.S. and Mexican governments.⁶⁶ However, the real work was carried out by the inter-departmental Pandemic Influenza Secretariat, and its duties were extensive.⁶⁷ These included liaisons with the private sector about the possible economic consequences of a major disease outbreak, developing regular communication with provincial health authorities, and working with the Canadian Food Inspection Agency and the different provincial veterinary agencies in developing protocols and protective measures.⁶⁸ Above all, the Secretariat was mindful of the reality that Washington placed national security considerations ahead of public health and economic issues, which was quite different from the perspective adopted by policy makers in Ottawa and Mexico City.⁶⁹ As a result, the Secretariat attempted to work closely with the Mexican members of the NAPAPI drafting team, as part of the strategy for developing a common front to offset the influence of the United States.⁷⁰ There was also the recognition that Mexico would be highly vulnerable if an influenza pandemic should emerge, given its lack of laboratory facilities, its insufficient number of qualified medical personnel, and its limited hospital surge capacity.⁷¹ Indeed, the prevailing view among many Mexican health professionals was that their country was “really a third world country” when faced with a major health emergency.⁷²

The guiding principle in drafting the North American Plan for Avian & Pandemic Influenza was the importance of appreciating different national responses to emergency planning, and above all “to keep the terminology general...and work out the technical details later.”⁷³ These guidelines proved most useful as the three national teams worked on their designated chapters.⁷⁴ Under this scheme, Canada had responsibility for drafting the sections on Avian Influenza and Emergency Coordination and Communications,⁷⁵ in part because of the international reputation of the Winnipeg based Canadian Science Center for Human and Animal Health, as well as the country’s 2003 experience in coping with the devastating SARS epidemic, and the high regard for Health Canada’s comprehensive 2004 report on Pandemic Influenza.⁷⁶ There was also a consensus that the controversial chapters dealing with border issues, and infrastructure should be assigned to the United States, given its preoccupation with homeland security.⁷⁷ Mexico’s primacy in the field of epidemiology meant that it was assigned the chapter on the theoretical aspects of pandemic human influenza.⁷⁸ This trilateral dialogue was greatly enhanced by the May 2007 statement by Secretary Leavitt, on behalf of the Homeland Security Council, that

in the event of an influenza pandemic, the United States Government intends to pursue a risk-based strategy at ports of entry (POE) ...[which] allows for continued movement of passengers and goods, while attempting screening out persons who may be infected with a pandemic virus...Border closure could potentially delay the introduction of pandemic influenza, allowing additional valuable time for pandemic preparedness, but such measures are unlikely to prevent the arrival of influenza in the United States...[and] would have significant negative consequences.⁷⁹

To ensure that the NAPAPI would not become another dusty report, provision was made for the establishment of a North American Coordinating Body for Avian and Pandemic Influenza, composed of “senior officials from most of the key agencies that would...play a significant role in promoting coordination among the three countries at senior official levels.” This body was given a mandate to coordinate three important functions: mutual assistance during an emergency when national resources were over-extended; coordinating joint exercises and pandemic training programs; and standardize risk communication systems between the three countries, along with mutually reinforced protocols “to help instill confidence in the North American ...[pandemic] strategies and activities.”⁸⁰

Many of these details were worked out during the eight month interval between Montebello, and the New Orleans Leaders summit of April 21-22, 2008. On this occasion, the North American Plan for Avian & Pandemic Influenza was hailed as incorporating “key accomplishments” under the SPP Emergency Management system, for having,

- developed guidelines and shared best practices in occupational health, infection control and personal protective measures to reduce potential risk to human populations of avian influenza;
- tested mechanism for communication among institutions to exchange epidemiological information; and,
- established a trilateral Laboratory and Surveillance Technical Working Group and identified areas of technical assistance needed to improve laboratory, surveillance and outbreak response to pandemic influenza in border areas and at the national level.

In addition, there were other aspects of trilateral cooperation that promised significant improvement in North American health security.⁸¹ One of these was the November 2007 Memorandum of Understanding between Canada, Mexico and the United States “to facilitate health-related aid during a cross-border emergency,” along with the agreement on principles for the screening of intercontinental air travelers “in the event of a pandemic.” Closely related was the commitment by Canada and the United States to provide Mexico with “technical assistance and training opportunities” in the building of a new Bio-Safety Level-3 National Laboratory.⁸² These initiatives were complemented by several bilateral developments such as the Canadian-US agreement to exchange full time liaison officers between their national public health agencies, which was duplicated by a similar Mexico-US arrangement.⁸³

NORTH AMERICAN HEALTH SECURITY SINCE NEW ORLEANS

After the 2008 New Orleans Summit there was a growing debate about whether avian influenza (H5N1) really represented a serious national and international threat. For some critics the “doomsday predictions...seem to be spreading faster than the virus itself,” and that the fear was “out of proportion to the current risk.”⁸⁴ There were also vocal “realists” who claimed the efforts of the United States, as the world’s premier advocate of biodefense preparedness, were insufficient to meet the scope and intensity of an avian influenza pandemic, with the most serious deficiency being a shortage of vaccines. On the other hand, defenders of the US pandemic preparedness system pointed out the number of important public health programs that had been adopted such as the implementation of the Pandemic and All-Hazards Preparedness Act, the creation of the Office of the Biomedical Advanced Research and Development Authority (BARDA),⁸⁵ and the passage of the FDA Pandemic Influenza Preparedness Strategic Plan.⁸⁶

Within the Canadian context there were efforts on the part of various departments and agencies to expand the country’s pandemic influenza research procedures, preparedness protocols and international cooperation programs. On the research side, the Canadian Institutes of Health Research established the Pandemic Preparedness Strategic Research Initiative (PPSRI), focusing on four priority fields: vaccines and immunization, understanding the influenza virus, prevention and treatment, and ethical issues associated with pandemic response strategies.⁸⁷ Another important development was the updated and improved

version of the 2006 Canadian Pandemic Influenza Plan for the Health Sector, notably its recommendations for increasing the capacity of the Pandemic Influenza Laboratory Preparedness Network (PILPN) in order to facilitate a common approach to laboratory testing during the inter-pandemic and pandemic alert periods, in identifying novel strains, and evidence of human to human-transmission.⁸⁸ More controversial was the commitment to obtain sufficient quantities of influenza vaccines to immunize the entire Canadian population, as well as providing additional supplies to the WHO for global distribution.⁸⁹ On a related front, in January 2009 the Canadian Food Inspection Agency officials announced the opening of their new level three laboratory at the Animal Health Centre in Abbotsford, British Columbia, in response to several serious outbreaks of avian influenza among commercial poultry flocks in the province.⁹⁰

This fear of a convergence between avian and human influenza was the focus of the 2008 publication, *One World One Health: A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface*.⁹¹ This innovative study called upon the global community to move beyond the traditional silos that divided the three major fields of human public health, veterinary science and environmental studies into separate and discrete entities since, “for each of the health domains, disease can emerge from the introduction of pathogens from sources within each system, or through cross-species jumping of pathogens across domains...each sector has a major incentive to prevent the incursion of disease into its specific domain.”⁹² Significantly, the report advocated regional as well as national initiatives in containing Emerging Infectious Diseases (EID) in general, and Highly Pathogenic Avian Influenza (HPAI) in particular, by establishing “coordinated surveillance and emergency planning that can effectively establish a shared strategy and the joint use of diagnostic and rapid response resources and facilities...the monitoring and management of cross-border movement of humans, animals and animal products.”⁹³ Many of these themes were subsequently discussed at the October 25, 2008 Ministerial Conference on Avian and Pandemic Influenza that took place at Sharm-el-Sheik, Egypt.

During this period, the North American Coordinating Board for Avian Pandemic Influenza (NACBAPI) was carrying out a series of meetings in each of the three countries. The initial goal was to implement the 31 specific tasks listed in the Pandemic Plan under 5 major categories: emergency coordination and communications; avian influenza, pandemic influenza; border monitoring and control measures; and critical infrastructure protection.⁹⁴ Administratively, these tasks were assigned to specific trilateral bodies, using, “where possible, existing SPP working groups, governmental structures or trilateral mechanisms.”⁹⁵ This process was greatly improved by the end of 2008, when a detailed consensus document was adopted about the operation of the Board, and by the launching of a major joint exercise to demonstrate how the three countries could cooperate within the scenario of a simulated pandemic influenza crisis.⁹⁶ An additional asset was the expansion of laboratory linkages between the three countries, with the Winnipeg National Microbiology Laboratory assuming a major role in this venture.⁹⁷

In Canada, these trilateral initiatives received strong political support from the country's public health establishment, as was evident when David Butler - Jones, Chief Public Health Officer, assured the Senate Standing Committee on National Security and Defense that the NAPAPI would improve Canada's response to a major influenza outbreak.⁹⁸ But what most concerned the senators was Butler-Jones' statement about the potential of a H5N1 pandemic: "The thing about the Asian one is that ...it kills a high percentage of birds and flocks...in a small percentage of people it can also cause disease...between 30 and 50 percent of those who get sick die... Most people would say eventually we will have another pandemic of influenza...How severe it will be is impossible to predict."⁹⁹

THE H1N1 (SWINE FLU) PANDEMIC OF 2009

On May 18, 2009 Dr. Margaret Chan, Director General of the World Health Organization, warned delegates at the World Health Assembly in Geneva about an imminent threat from a novel influenza A virus:

for five long years, outbreaks of highly pathogenic H5N1 avian influenza in poultry, and sporadic frequently fatal cases in humans, has conditioned the world to expect an influenza pandemic, and a highly lethal one...As you now know, a new influenza virus with great pandemic potential, the new influenza A (H1N1) strain, has emerged from another source on another side of the world. Unlike the avian virus, the new H1N1 virus spreads easily from person to person, spreads rapidly within a country once it establishes itself...We expect this pattern to continue.¹⁰⁰

Dr. Chan also made reference to a number of factors that increased the dangers of a deadly influenza outbreak: the possibility that it would become more pathogenic through the process of mutation; the prospect that the virus could evade existing antivirals such as Tamiflu; and the challenge of obtaining sufficient vaccine to protect the world's 6.8 billion inhabitants, particularly those living in developing countries.¹⁰¹ On the positive side, Dr. Chan pointed out the high degree of transparency and cooperation by countries such as Mexico, the United States and Canada, who at this stage of the outbreak accounted for over 90 percent of the global cases.

Worse was to follow. By early June this novel influenza virus had spread to 74 countries, with more than 28,700 cases confirmed by laboratory tests worldwide, along with 144 deaths. As a result, on June 11, the WHO raised the threat level to phase 6, which meant that each national government should implement its own pandemic plan, and be ready "for an imminent response." There were, however, a number of critics who suggested that the pandemic alert system "must consider how deadly the virus is, not just how fast it is spreading."¹⁰²

During the initial stages of the outbreak, there was little discussion by the WHO, or other international health organizations, about regional cooperation in dealing with the H1N1 pandemic. In many ways this is surprising, since as early as April 2009, the North American Plan for Avian and Pandemic Influenza had

already made a major impact on how the three countries would handle the outbreak.¹⁰³ This was evident when on April 16, Mexican health officials notified the Pan American Health Organization about the possibility that a novel form of swine flu influenza (H1N1/A) was responsible for a sudden and serious outbreak. These suspicions were confirmed when 16 of the 17 samples that had been sent to the Winnipeg National Microbiology Laboratory (NML) “tested positive for swine flu and that it was the same strain just isolated by the CDC from the very different cases in California.”¹⁰⁴ Further details about the involvement of the Winnipeg Laboratory were revealed during a joint interview with Frank Plummer, its scientific director, and Yan Li, an expert on influenza and SARS. According to their testimony, the laboratory first realized that the isolates sent by Mexican health authorities were influenza A(H1N1) after using molecular diagnostic tests, which revealed that of the 51 samples, 17 were positive for this strain of influenza A: “We have been preparing laboratories for diagnostics and to identify unknown or novel pandemic strains. It’s our job. In this case, we initially thought it was an unknown respiratory pathogen, but then the samples were positive for influenza. We were excited...felt that our work had paid off...”¹⁰⁵ In trying to determine reasons for the apparent high virulence of this H1N1 strain, the Winnipeg scientists also carried out the first genomic sequence of the virus, “looking for polymorphisms and correlating the genome sequences with the clinical outcomes.” There was, however, one major problem: how to obtain accurate and consistent clinical information from Mexican health authorities, who lacked the necessary medical technology, and were over-whelmed by the number of suspected H1N1 cases. The situation was partially remedied by sending a NML team of seven virologists and epidemiologists on site. Another perspective on the Winnipeg-Mexico City connection was provided by microbiologist Celia Alpuche, head of Mexico’s most advanced laboratory at the Instituto de Diagnostico y Rererencia Epidemiologios (InDRE), who praised the rapid diagnosis work of the NML, and its assistance in “helping us set up a real-time PCR (polymerase chain reaction) technology to test for swine H1N1 directly...[and] to train molecular biologists.”¹⁰⁶

During the spring of 2009 there was intense media coverage of this global health crisis, with many of the accounts being long on sensationalism, and short on scientific evidence. Unfortunately, this situation played into the hands of certain extremist groups, who attempted to exploit public fears, and perpetuate vicious falsehoods. This was particularly true in the United States, where there was a noticeable surge in the campaign for tighter restrictions on the Mexican border, including extensive medical examinations, and vigorous quarantine measures. To its credit, the Obama administration rejected such proposals as unnecessary and counterproductive, on the grounds that it would not prevent the spread of the H1N1 influenza virus, and, even worse, these measures would seriously disrupt US trade with its southern neighbor, causing economic distress in both countries.¹⁰⁷ One aspect of this on-going debate was the testimony of high ranking officials of the Department of Health and Human Services and the Department of Homeland Security, which lauded the effectiveness of the North American Plan for Avian and Pandemic Influenza. According to Mary Mazanec, deputy secretary for preparedness of response at HHS, the plan provided a

number of important assets: “First of all, just getting parties together in advance of such an event to start speaking to each other, identifying who the appropriate people are is really helpful, because then when have an event, you have a network created. We are basically in daily communication with Canada and Mexico...That’s crucial in an event like this.”¹⁰⁸

PROFILE OF A PANDEMIC

In its December 18, 2009 edition, the journal *Science* selected the novel H1N1 influenza “the virus of the year,” on the grounds that it had achieved official pandemic status, while “causing more confusion than catastrophe.” Harsh words were also directed towards the global response to the crisis, including inadequate surveillance in tracking the virus’ spread among pigs; unnecessary delays in the production and distribution of vaccines; obstructionist and ineffective measures such as quarantines; and widespread mistrust of the vaccine, particularly in the United States and Canada. Even more serious, the authors concluded, was “if influenza’s Big One had struck in 2009, we would have been in a world of hurt.”¹⁰⁹ Nor was *Science* alone in pointing out that the 2009 influenza outbreak was “the least lethal modern pandemic...[killing] about one of every 2,000 people who get it...[while] the Spanish flu of 1918 killed about 50 of every 2,000, and the 1957 and 1968 pandemics killed about 4 out of every 2,000.” As a result, there were serious questions of whether the World Health Organization should have categorized the H1N1 outbreak as a pandemic, along with ugly rumors suggesting some kind of collusion between the WHO leadership and major pharmaceutical companies such as GlaxoSmithKline (GSK), which made record profits from the global influenza crisis.¹¹⁰

The American and Canadian responses to the 2009 influenza pandemic reveal a number of interesting similarities. First, there was reliance on one major domestic vaccine company, with GSK enjoying a monopoly in the Canadian context, while the Aventis-pasteur facility at Swiftwater, Pennsylvania, dominated the US market.¹¹¹ In both countries there was a problem of delay in delivering the vaccine, a situation that caused considerable negative comment during the fall of 2009, reinforced by allegations that the rich and the famous were receiving preferential treatment.¹¹² Second, despite the relatively low level of morbidity and mortality, health care delivery systems, notably hospitals, were overwhelmed in many Canadian and American communities, and there were often problems of communication between spokesmen for the public health system and medical science providers. Third, because of the perceived crisis, special powers were assumed by the Public Health Agency of Canada and the US Department of Health and Human Services in providing vaccines, antibiotics and other therapeutics throughout their respective countries. This trend was more controversial in the United States where HSS was required to seek extra authority, through the auspices of the Emergency Use Authority (EUA), in order to use “investigative” new drugs or devices.¹¹³ Significantly, the fact that many Americans refused the opportunity to take vaccines and antivirals that had not been approved by the Federal Drug Administration raised serious questions about public trust in the public health system.¹¹⁴ Finally, in both countries there

were debates about the effectiveness of some of the major antibiotics in the national strategic stockpiles, notably ciprofloxacin and doxycycline, that are effective for use against anthrax and other Category A biological agents, but have “poor activity against community-acquired pneumonia (CAP) bacteria including *Staphylococcus aureus* and *Streptococcus pneumoniae*, 2 common postinfluenza pathogens.”¹¹⁵

All of the above issues are, of course, primarily under the jurisdiction of the respective national public health systems. Yet, the question that needed to be asked was how the broader aspects of cooperation that are covered by the North American Plan for Avian and Pandemic Influenza, came into play. Did the NAPAPI improve the capabilities of Canada, Mexico and the United States to deal effectively with the H1N1 influenza pandemic of 2009?¹¹⁶ While it is difficult to provide a comprehensive response to this question because of limited sources, existing evidence suggests that the trilateral influenza system was reasonably effective during the crisis. This was certainly the viewpoint of the three North American leaders when they met at the October 2009 Summit in Guadalajara, Mexico. At a special press conference Prime Minister Harper, President Obama, and President Calderon issued the following statement: “North America’s coordinated response to the initial outbreak of the H1N1 flu virus has proved to be a global example of cooperation...of a joint, responsible, and transparent response...We will remain vigilant and ...will work together to learn from recent experiences and prepare North America for the upcoming influenza season, including building up our public health capacities and facilitating efficient information sharing among our countries.”¹¹⁷ An even stronger endorsement of NAPAPI came from a subsequent briefing session of Canadian, American and Mexican health and security ministers in Mexico City. According to Deputy Secretary Jane Holl Lute of the US Department of Homeland Security, “our productive meetings today built on our ongoing collaborative efforts to prevent and respond to the spread of H1N1 within our nations and across our shared borders.”¹¹⁸ These gestures of mutual concern were reinforced by a number of operational initiatives. One of these was the continuation of cooperation between the Winnipeg National Laboratory, and the Centers for Disease Control; along with an equally strong commitment on the part of NML scientists to assist Mexican health authorities in dealing with the fall wave of flu cases.¹¹⁹ In addition, in October 2009 Canada’s Minister of Health, Leona Aqlukkaq announced that five million doses of its H1N1 vaccine stockpile would be sent to Mexico to make up for the country’s short-fall, “as testimony of the special relationship.”¹²⁰

While history does not repeat itself, there is still much to learn from past experiences. In other words, there are advantages of considering the recent crises involving H5N1 (avian influenza) and H1N1 (swine flu), in relation with the 1957-58 Asian Flu (H2N2) outbreak, the first major influenza pandemic in the antibiotic era. While Mexico was not involved in the 1957 North American response, Canada and the United States did develop a number of cooperative programs in their respective attempts to deal with this severe public health crisis. And it is instructive that many of the major complaints about government failures during that pandemic—delays in vaccine distribution, problems of

hospital surge capacity, lack of communication between different political jurisdictions—still resonate today.

CONCLUSION

The experience of the North American Plan for Avian and Pandemic Influenza (NAPAPI) provides an interesting case study of regional health security cooperation in dealing with a global crisis. In this paper particular emphasis has been placed on the Canadian experience, given this country's important role in drafting the NAPAPI in 2007, and its strong support of its various programs during the past three years. The Pandemic Plan must also be viewed as part of an important system of health security cooperation between Canada and the United States, based on their 70 year military biodefense agreements, their respective responses to the 1957 pandemic, their cooperative biodefense strategies since 9/11, and their common involvement with the Global Health Security Initiative.¹²¹

What are the lessons learned from the creation and operation of the North American Plan for Avian & Pandemic Influenza? Has it lived up to the expectations of those Canadian, American and Mexican experts who worked so hard to draft the document prior to the Montebello Summit? In what ways does this concerted trilateral planning effort in containing the 2009 influenza pandemic provide a useful model for other regional responses to this and other serious infectious diseases?¹²²

There are various ways of answering these questions. First, despite a surprising lack of publicity, the North American Plan for Avian & Pandemic Influenza represents an imaginative response towards one of the 21st century's most serious global disease threats, not only by providing an effective regional strategy in dealing with the emergency, but also strengthening the global strategy of the World Health Organization and affiliated international health agencies. Second, the development of the NAPAPI has profited from existing health security programs, above all from the Global Health Security Initiative (2001), both in terms of overlap in programs, and in reinforcing the level of contacts between medical and public health specialists in the three countries. Third, since President Bush's November 2005 National Strategy on Pandemic Influenza, there has been a gradual convergence of policies for preventing bioterrorism and emerging infectious disease, at home and abroad, described by the U.S. expert Marc Osfield as combining "the essential, multisectoral elements of a biodefense strategy...[that] are simultaneously central to any strategy to promote global health." In his opinion, the NAPAPI, with its commitment for the "sharing of medical countermeasures among SPP nations...could perhaps serve as examples or effective [international] models."¹²³

After the Montebello Summit there was a concerted effort by the United States and Canada to assist Mexico prepare for a possible pandemic as was promised in the 31 special commitments, including assistance for "improving the technical capacity of level 3 laboratories in Mexico and facilitating the development of software for integrated epidemiological and lab data for rapid analyses."¹²⁴ In turn, there are expectations that these facilities will generate greater interaction between Mexican infectious disease researchers, and their

counterparts at the Canadian Institutes of Health Research and the U.S. Institutes of Health Research.¹²⁵ Another important trend was the 2009 decision of the multi-national pharmaceutical company Sanofi-aventis, which has major vaccine operations in Toronto and Swiftwater (PA), to establish a new \$126 million facility at Ocoyoacac, Mexico which should “benefit public health in Mexico and the Latin American region, in the context of influenza pandemic preparedness.”¹²⁶

The final set of questions relates to the performance of the North American Plan for Avian and Pandemic Influenza during the 2009 H1N1 pandemic. For scholars, this is a difficult analytical task given the limited amount of information about the Plan’s operation during the past 12 months. Nevertheless, it would appear that the NAPAPI has made a difference in several important ways. First, at the early stage of the crisis, Mexican health authorities, working closely with the Winnipeg NML and the Atlanta CDC, were able to determine the identity of the virus, and rapidly convey this information to the World Health Organization.¹²⁷ Second, the on-going trilateral consultation carried out by the North American Coordinating Body for Avian and Pandemic Influenza both on the original 31 items of the Plan, and subsequent programs, meant that the necessary machinery for effective health security cooperation was in place when the H1N1 pandemic occurred. As David Butler-Jones informed reporters in April 2009, the NAPAPI “really does allow us to respond in a way that is more coherent as North American, as opposed to one country figuring it out on their own.”¹²⁸

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¹ The first known fatality was a 39 year-old woman who died April 12 of severe viral pneumonia in San Luis Potosi, a city of about 700,000 in central Mexico. *Washington Post*, April 26, 2009.

² John Barry, *The Great Influenza: The Epic Story of the Deadliest Plague in History* (New York: Penguin Books, 2005).

³ By the end of February 2010 Canadian health officials believed that the 2009 “swine flu” pandemic was no longer a threat, citing the fact that only two or three cases were evident per week, and that all of the mass vaccination clinics had been closed. It was estimated that about one third of Canadians contacted the virus, resulting in 1,488 hospitalizations and 78 deaths. Globally, there were about 16,000 fatalities. *Toronto Star*, February 24, 2010.

⁴ Peter Andreas and Thomas Biersteker, *The Rebordering of North America, Integration and Exclusion in a New Security Context* (New York: Routledge, 2003); Stephen Clarkson, *Does North America Exist? Governing the Continent After NAFTA and 9/11* (Toronto: University of

Toronto Press, 2008); Robert Pastor, *Toward a North American Community: Lessons from the Old World for the New* (Washington DC: Institute for International Economics, 2001).

⁵ The Winnipeg based National Microbiology Laboratory, began operation in 1998 as Canada's only level 4 laboratory, joining 14 other high containment facilities globally. It is presently under the jurisdiction of the Public Health Agency of Canada, and has a staff complement of over 400. It also shares the Winnipeg facility with the National Centre for Foreign Animal Disease, which is under the jurisdiction of the Canadian Food Inspection Agency, and has a staff of about 75. Both organizations are located in the Canadian Science Centre for Human and Animal Health. See www.phac-aspc.gc.ca and www.inspection.gc.ca/english/sci/lab.

⁶ An example of this new research approach can be found in the first volume of the journal *Global Health Governance*, notably the articles by David Fidler, "Architecture amidst Anarchy: Global Health's Quest for Governance," Eduardo Gomez, "The Challenge of Institutional Bias: Understanding the Different Impact of Epidemics on Public Health Institutions in Brazil and the United States," and Elizabeth Prescott, "The Politics of Disease Governance and Emerging Infections." See also Yanghong Huang, "In-Flew-Enza: Pandemic Flu and Its Security Implications," in *Innovation in Global Health Governance: Critical Cases* ed. Andrew F. Cooper and John J. Kirton (Aldershot: Ashgate Publishing, 2009), 127-50.

⁷ David Fidler and Lawrence Gostin, *Biosecurity in the Global Age: Biological Weapons, Public Health and the Rule of Law* (Stanford: Stanford University Press, 2008), 2.

⁸ Margaret Chan, Jonas Gahr Stare and Bernard Kouchner, "Foreign Policy and global public health: working together towards common goals," *Bulletin of the World Health Organization* 86, no. 7 (July 2008): 496; Ilona Kickbusch, Thomas Novotny, Nico Drager, Gaudenz Silberschmidt and Santiago Alcazar "Global health diplomacy: training across disciplines," *Bulletin of the World Health Organization* 85 no. 12, (December 2007): 971.

⁹ Fidler, "Architecture amidst Anarchy," 6.

¹⁰ In the case of the United States, for example, Marc Ostfield has pointed out that while there is growing awareness of the inherent synergy among biodefense, global health and foreign policy, "this growing recognition fails to understand that effective detection, response and recovery of mechanisms represent the essential, multisectoral elements of a biodefense strategy—and are simultaneous central to any strategy to promote global health." Marc Ostfield, "Strengthening Biodefense Internationally: Illusion and Reality," *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science* 6 no. 3, (2008): 265.

¹¹ *One World One Health: A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface* (October 14, 2008), 35.

¹² "WHO and World Bank join forces for better results from global health investments," *World Health Organization*, 5 August 2008. Available online at: www.who.int/mediacentre/news/releases/2008.

¹³ By 2007 the H5N1 Eurasian strain of the influenza A virus had infected birds in over 59 countries, and resulted in the deaths, through illness and culling, of 240 million birds. Mike Davis, *The Monster at our Door. The Global Threat of Avian Flu* (New York: Henry Holt & Co., 2006).

¹⁴ The countries most affected by H5N1 were Indonesia (141), Vietnam (109), Egypt (58), China (38), Thailand (25), and Turkey (12). Cumulative number of confirmed human cases of Avian Influenza A (H5N1) reported to the WHO, March 11, 2009, www.who.int/csr/disease/avian_influenza.

¹⁵ It was previously assumed that influenza pandemics would occur within a predictable range of years, but scientists now maintain that specific mutations and evolution in influenza viruses cannot be predicted. H.D. Klenk et al, *Avian Influenza* (Freiburg: Krager, 2008).

¹⁶ Health Canada, *It's Your Health: Preparing for an Influenza Pandemic*, Original: September 2006; updated: April 2009. Available online at: http://www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/diseases-maladies/pandem-eng.pdf.

¹⁷ "Security and Prosperity Partnership of North America," Government of Canada, [WWW.psp-spp.gc.ca/overview](http://www.psp-spp.gc.ca/overview). See Clarkson, *Does North America Exist?*, 42-43, 439-69.

¹⁸ "Pandemic Influenza," *North American Plan for Avian & Pandemic Influenza* (Ottawa/Washington, August 2007), 21.

¹⁹ Peter McKenna, *Canada and the OAS: From Dilettante to Full Partner* (Ottawa: Carleton University Press, 1995), 132.

²⁰ The PAHO was originally known as the Pan American Sanitary Conference (Bureau), functioned as an independent organization, with headquarters in Washington DC. In 1948 it became the regional agency of the newly formed World Health Organization, composed of 35 member countries. The name was changed to the Pan American Health Organization in 1958. Marcos Cueto, *The Value of Health: A History of the Pan American Health Organization* (Washington DC: Pan American Health Organization, 2007), 76.

²¹ By 1951 foot and mouth disease was eradicated from Mexico, after an expenditure of over \$100. Library and Archives Canada (LAC), Department of Agriculture Papers, Vol. 3452, file 4911-15, Ambassador C.P. Hevert to the Secretary of State for External Affairs, "Four Year Campaign Against Foot-and-Mouth Disease is Ending Successfully," May 24, 1951.

²² Marcos Cueto, *Cold War, Deadly Fevers: Malaria Eradication in Mexico, 1955-1975* (Baltimore: Johns Hopkins University Press, 2007), 75.

²³ In 1959 the Canadian government provided \$ 100,000 to the malaria eradication program, but this was regarded as a one time donation. LAC, Department of Foreign Affairs and International Trade (DEFAIT) records, Vol. 6920, File 5475-N-28-40, vol.1. Under Secretary Norman Robertson to Dr. G.D.W. Cameron, DM, Department of National Health & Welfare (DHW), April 29, 1959.

²⁴ Connaught smallpox experts worked closely with scientists in Brazil, which was one of the major sources of outbreaks in Latin America during the period 1965-75. Luis Barreto and Christopher Ruty, *The Speckled Monster: Canada, Smallpox and Its Eradication* (Ottawa: Canadian Public Health Association, 2006), 12-15. See also the account by Donald A. Henderson, *Bulletin of the World Health Organization* 86, no. 12 (December 2008): 917.

²⁵ "Timeline of Human Flu Pandemics, 1918-2007," National Institutes of Health and Department of Human Services. Canada, Dominion Bureau of Statistics: *Influenza in Canada, some statistics on its characteristics and trends*. Ottawa: The Bureau, 1958. The total death toll from influenza in Canada was cited as 1,741 or a rate of 10.8 per 100,000 population, while related pneumonia deaths were 5,347, or 32.3 per 100,000. There are, however, problems in using these figures since influenza was not a notifiable disease in some provinces, which meant that some overworked doctors did not necessarily report each influenza related fatality.

²⁶ LAC, Records of the Department of National Health and Welfare (DNHW), Vol. 1193, file 311-J2-1, Dr. G.D.W. Cameron, Deputy Minister of National Health to Dr. A. Somerville, Deputy Minister of Public Health, Edmonton June 7, 1957.

²⁷ *Ibid.*, E.H. Losing, Chief Epidemiology Division to Dr. D.S. Puffer, Assistant Chief Medical Officers of Ontario, June 21, 1957.

²⁸ Christoph Scholtissek, "History of Research on Avian Influenza," in *Avian Influenza*, ed., H.D. Klenk (Basel: Karger, 2008), 101-17.

²⁹ In contrast, the 1918 virus was assessed as being "most likely not a human/avian reassortant virus, but rather an avian-like virus that adapted to humans *in toto*." Jeffrey Taubenberger, Ann Reid, et al, "Characterization of the 1918 influenza virus polymerase genes," *Nature* 437 (October 6, 2005), 889-93; Elodie Ghedin et al., "Large-scale sequencing of human influenza reveals the dynamic nature of viral genome evolution," *Nature* 436 (20 October 2005): 1162-66.

³⁰ D.A. Henderson et al, "Public Health and Medical Responses to the 1957-58 Influenza Pandemic," *Biosecurity and Bioterrorism* 7, no.3 (2009): 270-71.

³¹ DNHW, Vol. 1193, file 311-J2-1, *Ibid.*, First Meeting of Advisory Committee on Influenza, July 11, 1957.

³² *Ibid.*, Report on Influenza Vaccine Production August 11, 1957.

³³ In the end, only a small quantity of U.S. produced vaccine was used in Canada. *Ibid.* G.D.W. Cameron, Deputy Minister of National Health, Memorandum to The Acting Minister, August 13, 1957.

³⁴ The NIH were quick to assure the American public that the US experience of using egg embryos in the production of vaccines for influenza and typhus during the Second World War caused only 15 fatalities out of some 20 million people immunized, with most of these deaths being associated

with a serious allergic reaction to eggs. NIH, Box 150, File 1-3-C Influenza 1958-72, Joseph Smadel, Associate Director NIH, to Dr. Geist, September 25, 1957.

³⁵ Apparently only about half of the vaccine produced in 1957 was actually used, and its effectiveness was relatively low, “ranging from 53% to 60% in studies conducted during the outbreak.” Henderson et al, “Public Health and Medical Responses,” 270.

³⁶ Significantly, Canada’s level of morbidity and mortality was lower than the United States, demonstrating the specific impact of the influenza virus among different hosts. Daniel Widelock and Sarah Klein, “Laboratory Analysis of 1957-58 Influenza outbreak in New York City,” *American Journal of Public Health* 50 no. 5, (May 1960): 649-60; Cecile Viboud et al, “1951 Influenza Epidemic, England and Wales, Canada and the United States,” *Emerging Infectious Diseases* 12 no. 4 (April 2006): 661-68.

³⁷ David Morens, Jeffrey Taubenberger, and Anthony Fauci, “Predominant Role of Bacterial Pneumonia as a Cause of Death in Pandemic Influenza: Implications for Pandemic Influenza Preparedness,” *Journal of Infectious Diseases*, 198 (October 1, 2008): 962; Albert Osterhaus et al, “Epidemiology of Avian Influenza,” *Journal of Infectious Diseases*, (October 2008) 1-10; Paul Torrance ed., *Combating the Threat of Pandemic Influenza: Drug Discovery Approach* (New York: A. John Wiley & Sons Publication, 2007).

³⁸ This U.S.-Canadian influenza exchange system benefited from the joint poliomyelitis surveillance reports that had already been established. DNHW, Vol.1194, file 331-J2-15, Alexander Langmuir, Chief Epidemiology Branch, to E.H. Lossing September 25, 1957. NIH, Box 150, File Influenza Research Committee, Associate Director NIH, memorandum for files September 3, 1957.

³⁹ NIH, Box 150, file Hong Kong Flu 1968, Recommendations of the Public Health Service Advisory Committee on Immunization Practices, Influenza 1968-69.

⁴⁰ In particular, there was a serious backlash against the Centers for Disease Control and Prevention for having championed the immunization campaign. Significantly, neither Canada nor Mexico were that affected by the 1976 flu scare. NIH Papers), Box 150, File 1-3-C, National Institute of Allergy and Infectious Disease: National Immunization Against Influenza, A Status Report, May 7, 1976. Richard Neustadt and Harvey Fineberg, *The Epidemic That Never Was: Policy Making & The Swine Flu Affair* (New York: Vintage Books, 1983).

⁴¹ Donald Avery, *The Science of War: Canadian Scientists and Allied Military Technology During the Second World War* (Toronto: University of Toronto Press, 1998), 151-75.

⁴² Donald Avery, “The Canadian Biological Weapons Program and the Tripartite Alliance,” in *Deadly Cultures: Biological Weapons Since 1945*, ed. Mark Wheelis, Lajos Rozsa, and Malcolm Dando (Cambridge, MA: Harvard University Press, 2006), 84-131; John Hart, “The Soviet Biological Weapons Program,” in *Deadly Cultures: Biological Weapons Since 1945*, ed. Mark Wheelis, Lajos Rozsa, and Malcolm Dando (Cambridge, MA: Harvard University Press, 2006), 132-56.

⁴³ Avery, “The Canadian Biological Weapons Program,” 104-07; Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat* (Carlisle, PA: U.S. Army War College, 2005).

⁴⁴ This trend was accelerated by the October 2002 creation of the U.S. Northern Command (USNORTHCOM), whose mandate included assistance to civil authorities in crises “related to terrorism threats, critical infrastructure protection, cross-border information sharing, public health and marine security.”

⁴⁵ By 2010, it was estimated that the US had spent over \$ 50 billion on civilian biodefense since 2001. The major recipients for this funding were HSS (31.7 billion), DHS (9.01 billion), and DoD (5.5 billion). Crystal Franco, “Billions for Biodefense: Federal Agency Biodefense Funding, FY2008-FY2009,” *Biosecurity and Bioterrorism*, 6 no. 2 (2008): 131-145.

⁴⁶ Barry Kellman, *Bioviolence: Preventing Biological Terror and Crime* (New York: Cambridge University Press, 2007), 150-52.

⁴⁷ The NBACC is composed of several specialized research centers, which analyze the next generation of biological weapons. *Ibid.*, 213; Jeanne Guillemin, *Biological Weapons: From the Invention of State-Sponsored Programs to Contemporary Bioterrorism* (New York: Columbia University Press, 2005), 200-05.

⁴⁸ Michael Mair, Beth Maldin and Brad Smith, "Passage of S.3678: The Pandemic and All-Hazards Preparedness Act," *Biosecurity and Bioterrorism* 5 no. 2, (2007): 72-74.

⁴⁹ "The United States-Mexico Health Commission Releases Its Accomplishments. Summary Report for 2008," www.globalhealth.gov/news/news/052109.html, and www.borderhealth.org/HHS.gov, Website for the United States-Mexican Border Health Commission.

⁵⁰ Thomas Inglesby, Rita Grossman and Tara O'Toole, "A Plague on Your City: Observations from TOPOFF," *Clinical Infectious Diseases*, 32 (2001): 436-45; US Department of Justice, Official Press Release October 8, 2002, "Justice Department, State Department to Conduct Exercises Combating Weapons of Mass Destruction," US Department of State, Fact Sheet-Office of Counterterrorism: TOPOFF, July 24, 2002.

⁵¹ This initiative was closely followed by the US-Mexico Border Partnership Declaration of March 2002, which established 22 immigration screening procedures.

⁵² Mexico's involvement with the GHSI was largely due to its on-going health security negotiations with the HSS, and strong support from the Mexican government of Vicente Fox. Interview with Dr. Ron St. John, former Director General of the Center for Emergency Preparedness and Response, Public Health Agency of Canada (PHAC), Ottawa, January 23, 2009.

⁵³ Ministerial Statement: Health Minister Launch Initiatives to Improve Health Security Globally, Mexico City, December 2002. www.ghsi.ca/english/statementmexicocityDec2002.asp.

⁵⁴ The SARS epidemic affected 29 countries, and resulted in 8,439 cases, with 812 deaths. Canada was one of the countries most affected by this mysterious epidemic, with 438 people requiring hospitalization, of whom 44 died. Almost all those infected by SARS were either hospital patients or hospital professionals and workers. Jacalyn Duffin and Arthur Sweetman, eds., *SARS In Context: Memory, History, Policy* (Montreal/Kingston: McGill-Queen's University Press, 2006); Clete DiGiovanni et al, "Factors Influencing Compliance with Quarantine in Toronto During the 2003 SARS Outbreak," *Biosecurity and Bioterrorism*, 2 no. 4 (2004): 265-72.

⁵⁵ The United Kingdom, France, Germany, Mexico, Canada and the WHO all hosted workshops dealing with various aspects of an influenza pandemic. *Ibid.*, Sixth Ministerial Meeting on the Global Security Initiative, Rome, November 2005.

⁵⁶ Revisions of the original IHR had been on-going throughout the previous decade, and cooperation had been enhanced by the end of the Cold War. Jonathan Tucker, "Updating the International Health Regulations," *Biosecurity and Bioterrorism*, 3 no. 4 (December 2005): 338-47.

⁵⁷ In Canada, GHSI was directed by Ron St. John, Director General of CEPR; while in the United States, responsibility was shared between HHS and the Department of State. In Mexico, the Ministry of Health was the dominant organization.

⁵⁸ The National Microbiology Laboratory is one of fifteen high containment facilities (BSL-4) operating in the world. Its Director, Frank Plummer, is also Director General of the Centre for Infectious Disease Prevention and Control, and professor at the Faculty of Medicine, University of Manitoba. See www.phac-aspc.gc.ca.

⁵⁹ Reference was also made to the establishment of a Coordinating Body of senior officials "to ensure follow-up on these commitments." Joint Statement by President George W. Bush, Prime Minister Stephen Harper of Canada and President Vicente Fox of Mexico—the Security and Prosperity Partnership of North America. www.spp.gov

⁶⁰ David Rosner and Gerald Markowitz, *Are We Ready? Public Health Since 9/11* (Los Angeles: University of California Press, 2006).

⁶¹ By 2007 most of the ten Canadian provinces had drafted their own influenza response plans, along with the commitment to provide free influenza vaccine during flu season.

⁶² The six authors of this report included Dr. Julio Frenck Mora (Secretario de Salud) and Dr. Pablo Kuri Morales (Director General de la Direccion General de Epidemiologia). The latter was actively involved with the GHSI, representing Mexico at various meetings.

⁶³ President Bush's plan called for Congress to authorize \$7.1 billion, which would be used for increased preparedness in vaccine and drug production, disease surveillance at home and abroad, and assistance to state and emergency response operations. *The New York Times* November 1, 2005.

⁶⁴ This group included Peter Boehm (Canada-DEFAT), Paula Dobriansky (USA-State) and Pablo Kuri (Mexico-Health). Interview Peter Boehm, N.A. Division DEFAIT, 15 November 2007. See also www.state.gov/r/pa/ei/biog/2969.htm.

⁶⁵ Joint statement by President George W. Bush, Prime Minister Stephen Harper, and President Vincent Fox, cited in the web-page of The Security and Prosperity Partnership of North America, www.spp.gov

⁶⁶ Interview with Donald McPhee, Director, Health & Population Division, DEAIT, 6, November 13, 2007.

⁶⁷ The Inter-Departmental Secretariat was created in 2004 under the auspices of the Department of Public Safety. Interview with Gail Miller, Ottawa, January 23, 2009.

⁶⁸ Initially, there were questions about having a separate section on avian influenza, since it might divert attention from the more critical human influenza problems, and that Mexico had only limited expertise in this field. *Ibid.*

⁶⁹ Canadian experts were aware that three of the major US departments—Agriculture, Health and State—were supportive of the NAPAPI scheme. In the case of the Department of Homeland Security, it's reticence was counteracted by the determination of the White House “to knock heads together to obtain a coherent policy.” *Ibid.*, Interview Marc Ostfield, Senior Advisor Bioterrorism, Biodefense and Health Security, US Department of State, Washington DC, April 28, 2007.

⁷⁰ In August 2007 the author carried out a series of interviews in Mexico City in an attempt to learn more about the Mexican perspective on health issues associated with pandemic influenza. All of these sessions focused on medical infection specialists associated with the Secretaria de Salud (Health Ministry, and its three major divisions dealing with infectious diseases: the Servicio de Infectología, Instituto Nacional de Enfermedades Respiratorias (INER); the Instituto nacional de Diagnostico y Referencia; and the Consejo Nacional de Seguridad en Salud. Of these, the most important organization is INER, given its role in operating an important level three research laboratory.

⁷¹ In 2007 Mexico had four BSL-3 laboratories, concentrated in Mexico City, which were not sufficiently coordinated with major hospitals in other regions. Interview with Dr. Eduardo Sada Diaz, Director of the laboratory section of INER, Mexico City, August 23, 2007.

⁷² An August 2007 INER study, carried out by Diana Torres and Yazmin Godinez, examined Mexico's hospital facilities and influenza preparedness. Interview, Ministry of Health, Mexico City, August 24, 2007.

⁷³ Interview Sonia Le Bris, Senior Policy Advisor, Pandemic Preparedness Secretariat, Public Health agency of Canada, Ottawa, November 14, 2007.

⁷⁴ “Avian Influenza,” in *North American Plan for Avian & Pandemic Influenza* (Ottawa: August, 2007), 1.

⁷⁵ “Emergency Coordination and Communications” in *North American Plan for Avian & Pandemic Influenza*, 1-2. In Canada, the key agencies were the Public Health agency of Canada, Health Canada, Public Safety Canada, The Canadian Food Inspection Agency and the Department of Foreign Affairs and International Trade. For the US there were six lead departments: Homeland Security, Health and Human Services, State, Defense, Agriculture and Transportation. In contrast, Mexico's response was primarily the responsibility of the Ministry of Health, which headed the National Committee for Health Security, assisted by the ministries of the Interior, Agriculture, the Environment and Foreign Affairs.

⁷⁶ Unlike Canada and the United States, Mexico had no problems concerning the movement of health professions between the different states and municipalities. “Border Monitoring & Control Measures Associated With Pandemic Influenza,” *North American Plan for Avian & Pandemic Influenza*, 3-4.

⁷⁷ One problem of detection was that many infected people were asymptomatic, or traveled during the incubation phase of the illness. “Emergency Coordination and Communications” in *North American Plan for Avian & Pandemic Influenza*, 1-2.

⁷⁸ “Pandemic Influenza,” in *North American Plan for Avian & Pandemic Influenza*, 2-4.

⁷⁹ In February 2007 Secretary of State Rice strongly supported the influenza plan during the important SPP ministerial meeting in Ottawa. Directive forwarded by Mr. Bill Brooks, G/AIAG, U.S. Department of State, May 5, 2007.

⁸⁰ "Pandemic Influenza," in *North American Plan for Avian & Pandemic Influenza*, 4.

⁸¹ Joint Statement by Ministers Responsible for the Security and Prosperity, February 28, 2008. (SPP.Gov).www.spp.gov/news/news_02282008.asp. Another joint initiative was the plans to provide emergency medical assistance to countries in the Central American region, by providing medical supplies from the International Red Cross warehouse in Panama.

⁸² This attempt to improve the laboratory capabilities of Mexico's Health Ministry and its Center for Disease Control Laboratory Response was reinforced by a bilateral arrangement, between Mexico and the U.S. "to bolster surveillance efforts for seasonal and pandemic influenza," by improving the capabilities of three specific Mexican laboratories, as well as facilitating "the development of software for integrated epidemiology and lab data for rapid analysis." *Ibid.*

⁸³ It was anticipated that there would be a trilateral exchange of national public health agency personnel by the end of 2008. SPP Website: "Key Accomplishments Since August 2007."

⁸⁴ Rebecca Cook Dube, "Skeptics warn bird flu fears are overblown. Chicken little alert? Hysteria could sap money from worse health threats." MSNBC.com. Ned Feder, "Commentary: Pandemic Flu vaccine needs help," *Federal Times*, June 1, 2008. www.federaltimes.com.

⁸⁵ BARDA had been created in December 2006 to coordinate medical countermeasures, particularly the development of new vaccines and medicines, "to counter biological, chemical, radiological, nuclear, and other security threats. Michael Blair et al, "Passage of S.3678: The Pandemic and All-Hazards Preparedness Act," *Biosecurity and Bioterrorism*, 5 no. 1 (March 2007): 72-74.

⁸⁶ U.S. Food and Drug Administration: FDA Pandemic Influenza Preparedness Strategic Plan, 17 March 2008, Executive Summary, 2.

⁸⁷ Canadian Institutes of Health Research: Pandemic Preparedness Strategic Research Initiative-Report on Activities & Outcomes (2007). See www.cihr-irsc-gc.ca/cgi-

⁸⁸ The Canadian Pandemic Influenza Plan for the Health Sector, September 5, 2008, Annex C-revised. See www.phac-aspc.gc.ca/.

⁸⁹ It was estimated that two doses of vaccine would be required in order to obtain sufficient protection, particularly if there was an antigenic drift during the pandemic. *Ibid.*, Annex D: Preparing for the Pandemic Vaccine Response.

⁹⁰ The Abbotsford facility has the responsibility for providing a safe and rapid diagnostic environment for analyzing avian influenza, swine flu, and the West Nile virus. It also complements the Canadian Food Inspection Agency's BSL-4 laboratory in Winnipeg. *Abbotsford Times* 12 December 2008. Canadian Food and Inspection Agency, Summary Report: Response to Findings of Notifiable Avian Influenza (H5N2) in the Fraser Valley of British Columbia, November 2005.

⁹¹ "WHO and World Bank join forces for better Results from Global Health Investments," 5 August 2008, www.who.int/mediacentre/news/releases/2008.

⁹² Risk areas, associated with this convergence between these two sectors, include shared ecosystems between domestic and wild animals/poultry, trade in wildlife or bush meat, and newly encroached forest areas and wetlands. *One World One Health: A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface* (October 14, 2008), 30.

⁹³ After October 2005 a series of meetings of national health ministers that took place in Washington, Beijing, Vienna, Bamako, New Dehli, and Sharmel-sheikh. The latter event involved 65 countries.

⁹⁴ The largest number (10) of the thirty one assignments were under Emergency Coordination and Communications, with Avian Influenza (4), Pandemic Influenza (9), Border Monitoring and Control (6), Critical Infrastructure (3) accounting for the remainder. *North American Plan*, Annex 1: Major Tasks.

⁹⁵ In the Canadian case, the lead agencies were Public Safety, in dealing with Emergency Coordination; the Canadian Food Inspection Agency, for Avian Influenza; the Public Health Agency of Canada for Pandemic Influenza and for Border Monitoring; with Public Safety handling Critical Infrastructure. Telephone interview with Bill Horne, Senior Researcher Pandemic Preparedness Office, DEFAIT, January 20, 2009.

- ⁹⁶ The first meeting took place in Ottawa during the fall of 2007, and was chaired by Scott Broughton, Senior Assistant Deputy Minister of Public Safety. The Chair of the Coordinating Committee rotates among the three countries. Interview with Gail Miller, January 23, 2009.
- ⁹⁷ By 2008, the Coordinating Committee was able to make arrangements for the movement of health professionals across the two borders during a serious outbreak of avian or pandemic influenza. Interview with Bill Horne, January 20, 2009.
- ⁹⁸ Canada: Proceedings of the Senate Committee on Health, February 4, 2008.
- ⁹⁹ Butler-Jones also discussed the features of Canada's new Quarantine Act (2006), the status of the National Emergency Stockpiles, the level of protection for hospital health workers, and Canada's membership in the International Association of National Public Health Institutes. *Ibid.*
- ¹⁰⁰ World Health Organization, "Concern over flu pandemic justified," Dr. Margaret Chan, Director-General of the World Health Organization, Address to Sixty-second World Health Assembly, Geneva, Switzerland, May 18, 2009.
- ¹⁰¹ "WHO chief does not raise swine flu alert level," *Associated Press*, May 18, 2009, www.google.com/hostednews/ap/article/AL.
- ¹⁰² "Flu Pandemic underway," *Nature News*, June 11, 2009.
- ¹⁰³ Although the first cases in Mexico occurred in March, it was not until mid-April that Mexican public health officials were able to confirm that a severe respiratory outbreak had occurred in the Vera Cruz region of Mexico.
- ¹⁰⁴ Since the NAPAPI, links between the Winnipeg lab and public officials in Mexico have greatly expanded. It was, therefore, not surprising that the first H1N1 lung and throat swabs were sent to NML, rather than to the CDC laboratory in Atlanta, particularly since the turn-around time for the analysis was only six hours. Jon Cohen, "Exclusive: Interview with head of Mexico's Top Swine Flu Lab," *Science Now*, May 1, 2009. Available at <http://news.sciencemag.org/sciencenow/2009/05/01-01.html?rss=1>.
- ¹⁰⁵ "The Virus spy: Yan Li talks about spotting the novel swine flu virus at Canada's National Microbiology Laboratory," *Nature News* June 19, 2009. Available online at <http://www.nature.com/news/2009/090619/full/news.2009.583.html>.
- ¹⁰⁶ Cohen, "Exclusive: Interview with head of Mexico's Top Swine Flu Lab."
- ¹⁰⁷ In his address President Obama stressed the fact that there was a movement of almost a million persons a day across the U.S.-Mexican border, plus the annual trade of over \$350 billion as reasons for avoiding a "huge economic disruption." "Obama Faces Calls for Tighter Restrictions on Mexican Border," *The Wall Street Journal*, April 29, 2009.
- ¹⁰⁸ Mary Kosinski, a policy adviser at the U.S. Department of Health and Human Services, also praised the NAPAPI for providing "the backbone that we need now." Jennifer Ditchburn, "North American plan helped with swine flu," *The Canadian Press*, April 30, 2009. Available online at cnews.canoe.ca/CNEWS/World/2009/04/30.
- ¹⁰⁹ "Special Section: Virus of the Year," *Science*, 326 (18 December 2009): 1607.
- ¹¹⁰ GSK sales of H1N1 vaccine in 2009 totaled 883 million English pounds, providing record profits for the company. see *Globe & Mail* 4 February 2010. On January 22, 2010 the WHO issued an official refutation of charges that it had "created a 'fake' pandemic to bring economic benefit to industry," reinforced by a detailed set of arguments. WHO web-site. See "WHO slams charges," *Associated Press*, January 25, 2010.
- ¹¹¹ By 16 January 2010, a total of 25.143 million doses of three vaccines had been distributed by the Public Health Agency of Canada: Arepanrix (adjuvanted from GSK); Influenza A (H1N1) monovalent, with adjuvant (GSK); and Panvax (unadjuvanted) from CSL Australia. The average rate of adverse reaction matched the season level of 1 per 100,000 doses, including 26 cases involving pregnant women. "Vaccine Surveillance Report, January 28, 2010," Public Health Agency of Canada. www.phac-aspc.gc
- ¹¹² This controversy of "queue" jumping was particularly pronounced in Toronto, when it was revealed that members of the city's professional sports teams, and wealthy patrons of hospital boards received the H1N1 vaccine before the rest of the public. *Healthzone.ca*, November 6, 2009.
- ¹¹³ Susan Sherman et al, "Emergency Use Authority and 2009 H1N1 Influenza," *Biosecurity and Bioterrorism*, 7 no. 3 (2009): 245-50; Sandra Quinn et al, "Public Willingness to Take a Vaccine

or Drug Under Emergency Use Authorization During the 2009 H1N1 Pandemic,” *Biosecurity and Bioterrorism*, 7 no. 3 (September 2009): 275-91.

¹¹⁴ A December report of the WHO Global Advisory Committee on Vaccine Safety reported that there were no unexpected safety concerns associated with any of the H1N1 vaccines. *The Lancet*, 375 (January 2, 2010): 9.

¹¹⁵ Sando Cinti, “Bacteria Pneumonias During An Influenza Pandemic: How Will We Allocate Antibiotics?” *The Lancet*, 375 (January 2, 2010): 311-16.

¹¹⁶ The fact that Canada took over the G-8 presidency in January 2010 has raised expectations that the Harper government will adopt a more positive stance in meeting the Millennium Development health goals. *The Lancet*, 374 (October 10, 2009), 1215.

¹¹⁷ Joint Statement by North American leaders, August 10, Guadalajara, Mexico, *Canada News Center*. Prime Minister Harper issued his own individual assessment of the situation, praising the “shared and effective response thus far to H1N1—a cross border threat to all of us.” Statement by the Prime Minister of Canada, August 10, 2009, www.pm.gc.ca

¹¹⁸ The US delegation also included DHS Assistant Secretary for Health Affairs, while the Mexican delegation was led by the Deputy Secretary of Prevention and Promotion, Ministry of Health. Canada was represented by Morris Rosenberg, Deputy Minister of Health, and by Myles Kirvan, Associate Deputy Minister of Public Safety. October 5, 2009. www.dhs.gov Canada, Office of the Minister of Health, Press Briefing Sessions, October 4, 2009.

¹¹⁹ “Infection and death from influenza A/H1N1 virus in Mexico,” *The Lancet*, 374 (December 19, 2009): 2032-33; Jose Cordova-Villalobos et al, “The Influenza A (H1N1) epidemic in Mexico: Lessons Learned,” *Health Research Policy and Systems*, September 28, 2009.

¹²⁰ Under the agreement, Mexico would replenish the Canadian supply by March 31, 2010. *Canwest News Services* January 6, 2010.

¹²¹ During the spring stage of the 2009 H1N1 pandemic there were numerous comparisons between this event and the so-called 1976 “Swine Flu” fiasco. In general, these accounts were rather simplistic, ignoring the complexity of the 1976 situation. Moreover, as one contemporary writer observed “if 20,000 people are vaccinated and one has side effects, is that enough reason to not have protected the other 19,999?” *Globe & Mail*, December 10, 1976.

¹²² The devastating impact of SARS on Toronto’s hospitals has recently been reassessed. Of the 44 who died, and the over 300 who experienced debilitating health problems, many were medical care professionals in Toronto hospitals, with a number being victims of the second wave of SARS in May 2003, when the provincial government declared that the health crisis had passed. In February a class action suit was launched against the provincial government for negligence. It was unsuccessful. *Toronto Star*, February 26, 2009.

¹²³ Marc Ostfield, “Strengthening Biodefense Internationally: Illusion and Reality,” *Biosecurity and Bioterrorism*, 6 no. 3 (September 2008): 265.

¹²⁴ “Security and Prosperity...Key accomplishments since August 2007.” www.spp.gov

¹²⁵ In 2004, for instance, the Mexico-Canada Joint Health Research Program in Tuberculosis was launched, under the direction of the Ministry of Health of Mexico and the CIHR to promote scientific cooperation between universities or affiliated research organizations through collaborative research project grants. It provides a total of \$120,000 in research support annually (50 percent by each government). See CIHR partnership with Mexico, CIHR web-page, www.cihr-irsc.gc.ca.

¹²⁶ Press release Sanofi-Aventis, March 9, 2009. Available at: www.Sanofi-Aventis.ca.

¹²⁷ The existence of the Plan appears to have strengthened the resolve of the Obama administration to maintain open borders with Mexico, despite demands for stringent quarantine measures.

¹²⁸ *Canadian Press* April 30, 2009.